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Reply

Sir,
We thank Stanley Shaldon for his critical comments on our introductory paragraph about the history of home haemodialysis. We have furthermore been informed by Christopher Blagg that they started their home haemodialysis program in Seattle also in 1964 (personal communication). We are in no position to judge whose claims about the history of home haemodialysis are true and whose are not. As a matter of fact, two of us weren't even born in 1961. Nevertheless, we think that the readers of NDT should be provided with all the available data so that each reader can decide themselves whose perception of truth they will follow. We have to insist, however, that the mountain climbed by the patient from Lauterbrunnen is called 'Mönch' and not Munck—a fact that can easily be verified.

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Letters

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Pseudohyperchloraemia due to bromvalerylurea abuse

Sir,
Electrolyte imbalance is one of most common causes of unexplained neuropsychological manifestations, but disturbed consciousness due to hyperchloraemia is very rare today. Medication history is generally not easy to obtain spontaneously while obtaining a patient's history; clinicians need to consider carefully the possibility of bromism due to chronic bromide intoxication as one option in an insidious toxic syndrome. We present a case of a patient who suffered from progressive ataxia, dysarthria, dysphagia, delusions, and auditory and visual hallucinations for a year. To our knowledge, this is the first case report of chronic bromvalerylurea (BVU) intoxication presenting with pseudohyperchloraemia in the English literature.

A 73-year-old man with no chronic disease history developed incoherent speech and loss of short-time memory 1 year ago, dysarthria, deteriorated cognitive function and frequent falls had also been noticed for 6 months. Ten days before hospitalization, he was found lying on the floor at home with residual consciousness, worsened dysarthria and incoherent speech. Delirium was also noted over the following days. On arrival at our Emergency Department, a neurological examination revealed incoherent speech, disorientation as to place and time, mild dysarthria, a poor gag reflex with easy choking and gait disturbance (wide-based). His muscle power was full and his bilateral deep tendon reflex, sensory system and autonomic functions were intact. The Romberg's test was negative but he failed the tandem gait test. The rapid alternative movement and finger–nose–finger tests were done clumsily. Other aspects of the physical examination were unremarkable. Initial laboratory studies revealed that haemogram, electrolyte (including sodium, potassium and calcium), liver function and renal function tests were all within the normal range, except for a marked hyperchloraemia (179 mmol/l) and a negative anion gap (the calculated anion gap $[Na^+ - (Cl^- + HCO_3^-)]$ was −67.1 mEq/l). The work-up for the negative anion gap, including serum lithium level (a suspicion of lithium toxicity), and electrophoresis with immunofixation (a suspicion of multiple myeloma) were all negative. It should be noted that serum chloride levels are rarely as high as that in our patient with lithium toxicity or multiple myeloma. During hospitalization, he also presented with persecutory delusion and bizarre behaviour, as well as both visual and auditory hallucinations. Brain magnetic resonance imaging (MRI) showed periventricular leukoaraiosis and possible microangiopathy. An electroencephalogram (EEG) recording revealed patterns of moderate diffuse cortical dysfunction.

A careful medication history inquiry with his family revealed the patient took 'Ming-Tong Chih Tong Dan (MTCTD)', a non-steroidal anti-inflammatory drug (NSAID) containing BVU that is sold over the counter. He had taken 4–5 packages of this drug daily for about 5–6 years to treat his persistent headache; this drug contains ethoxybenzamide (350 mg), caffeine anhydrous (50 mg), acetaminophen (200 mg) and BVU (200 mg) per package. Six months prior to admission, the total daily dosage had been gradually increased to 10–15 packages per day due to a worsening of the headache.

We examined the serum at ∼11 days after the last dose of MTCTD and the result showed a bromide level of 101.5 ± 1.9 mg/dl, measured by inductively coupled plasma mass spectrometry (ICP-MS). Forced diuresis with intravenous normal saline, as well as intravenous furosemide was carried out. The neurological symptoms and signs (dysarthria, delirium and cerebellar ataxia) recovered rapidly over the next 3–5 days. Repeat analysis at ∼24 days after the last dose of MTCTD showed that the serum chloride and bromide levels had declined [chloride, 104 mmol/l measured by an ion-selective electrode (ISE); and bromide, 6.15 ± 2.6 mg/dl measured by ICP-MS]. Two weeks later, his score on the Mini-Mental State Examination (MMSE) showed a significant improvement. Occasional cases of bromide intoxication have been reported previously [1–6], mainly due to the use of bromide-containing products in non-prescription preparations, such as analgesic, antitussive or anti-epileptic drugs. As with our patient, most diagnoses were aided by a negative anion gap and hyperchloraemia, because bromide is always regarded as chloride by automated analysis when measurement is by an ISE. The ISE method results in a higher apparent chloride concentration in sera when it also contains bromide or another halide [6].

The neurological manifestations seem to be dose related, but the correlation between the blood level of bromide and its toxicity is uncertain. A serum level >20 mg/dl is considered toxic [4]. Bromides have a long half-life (10–14 days) and the ion is eliminated mainly through the kidney. The half-life can be reduced from 12 days to <3 days with saline diuresis alone [7] and 1–2 h with haemodialysis therapy [3]. Although emergent haemodialysis is very effective due to the rapid clearance that occurs [5], it is unusual to use this as the first choice because most patients respond well to saline diuresis.

In conclusion, although bromism is rare today, a review of the patient's medical history for bromide-containing